CLASSIFICATION ~~CONFIDENTIAL~~ CONFIDENTIAL

CENTRAL INTELLIGENCE AGENCY

REPOR [redacted] 32

INTELLOFAX

INFORMATION REPORT

25X1A

COUNTRY Korea/USSR

DATE DISTR. 21 March 1951

SUBJECT Examination of Soviet Micrometer Caliper of the Vernier, Slide Type

NO. OF PAGES 5

PLACE ACQUIRED [redacted]

NO. OF ENCLS. (LISTED BELOW)

DATE ACQUIRED 25X1A

SUPPLEMENT TO REPORT NO. 25X1X

DATE PRODUC
DATE OF I

[redacted]

1. The instrument tested is described as follows:

   a. A vernier slide caliper graduated in metric units to read from 0 to 150 mm.

   b. The type or serial number stamped on the instrument is 019594.

   c. The official specifications for the instrument as reported on the inspection certificate are contained in GOST 166-41.

   d. The instrument was treated with a grease preservative and wrapped in paper.

   e. The instrument, accompanied by an inspection certificate from the Leningrad Instrument Factory, was packed in a wooden instrument case with a sliding cover bearing the mark LIZ.

2. Tests, as reported below, were conducted to explore the following:

   a. Accuracy of the instrument.

   b. Conformity of the instrument with specifications in GOST 166-41.

   c. Identification of the metal from which the instrument was made.

   d. Identification of the preservative found on the instrument.

   e. Identification of the paper in which the instrument was wrapped.

   f. Identification of the wood from which the instrument case was made.

   g. Identification of the varnish, plywood bonding agent, and adhesives used in fabricating the instrument case.

3. Specific tests performed are reported as follows:

   a. Comparison with specifications GOST 166-41.

      (1) Finish meets standards except for a few marks on the reverse side of the beam beyond the 140 mm graduation. These

marks do not affect the accuracy of the instrument.

(2) The Rockwell hardness ("C" scale) is in excess of the specified minimum and measured as follows:

Fixed jaws	64 R.C.
Moveable jaws	59 R.C.

(3) The width of the graduation marking is within the prescribed range (0.08 - 0.12 mm) and measures as follows:

Main scale	0.116 mm
Vernier scale	0.110 to 0.119 mm

(4) The total variation in width of scale markings is within the prescribed limit of 0.03 mm.

(5) The thickness of the beveled edge of the vernier measures from 0.16 mm to 0.20 mm, which exceeds the specified maximum of 0.15 mm.

(6) The gap between the vernier and the main scale is 0.04 mm, well within the specified maximum of 0.07 mm.

(7) The slow-motion adjustment screw has play of less than $\frac{1}{4}$ turn, which is the specified maximum.

(8) The specified minimum internal measuring diameter of 10 mm $\pm$ 0.02 mm is met by the instrument.

(9) The error in parallelism between the measuring surfaces of the jaws is 0.005 mm before locking the sliding jaw and 0.003 mm with the sliding jaw locked. The first value is outside the prescribed limit of 0.003 mm. The second value is within the prescribed limit of 0.006 mm.

(10) Interference bands are visible over the entire surface of the jaws when checked with an optical flat, as required by the specifications.

(11) The top reading of 150 mm as measured at 23° c. with a gage block combination is in error by less than the permitted maximum of 0.05 mm.

b. Examination of the main scale and vernier graduations for accuracy disclosed no error greater than 0.010 mm.

(1) The length of each interval in the first centimeter of the main scale, measured approximately 1 mm from the ends of the graduation marks at 23° c., is as follows:

Interval on Scale (mm)	Measured Interval (mm)
0 to 1	1.004
1 to 2	1.003
2 to 3	0.994
3 to 4	1.002
4 to 5	1.003
5 to 6	0.996
6 to 7	1.000
7 to 8	0.996
8 to 9	1.006
9 to 10	1.000

CONFIDENTIAL

(2) The length of each centimeter interval on the main scale at 23° c. was determined to be as follows:

Interval on Scale (cm)	Measured Interval (mm)
0 to 1	10.009
0 to 2	20.012
0 to 3	30.014
0 to 4	40.014
0 to 5	50.016
0 to 6	60.018
0 to 7	70.016
0 to 8	80.016
0 to 9	90.016
0 to 10	100.018
0 to 11	110.020
0 to 12	120.021
0 to 13	130.024
0 to 14	140.026
0 to 15	150.030

(3) The length of each interval on the vernier scale at 23° c. was determined to be as follows:

Interval on Vernier Scale	Measured Interval (mm)
0 to 1	1.952
1 to 2	1.951
2 to 3	1.950
3 to 4	1.954
4 to 5 (marked "25")	1.948
5 to 6	1.954
6 to 7	1.950
7 to 8	1.946
8 to 9	1.962
9 to 10 (marked "50")	1.948
10 to 11	1.952
11 to 12	1.954
12 to 13	1.944
13 to 14	1.948
14 to 15 (marked "75")	1.946
15 to 16	1.948
16 to 17	1.942
17 to 18	1.947
18 to 19	1.946
19 to 20 (marked "1")	1.959

c. The composition of the metal from which the instrument was made was determined as follows:

(1) Sparks produced by grinding wheel indicated 0.40 to 0.45 per cent carbon with no significant amount of alloying elements present. On this basis the material was found comparable to SAE 1040 steel.

(2) Spectrochemical analysis has yielded the following information concerning trace elements present as residuals from scrap metal used in making the steel:

Magnesium	Mn	0.71%
Silicon	Si	0.29
Nickel	Ni	0.22
Copper	Cu	0.18
Chromium	Cr	0.16
Iron and carbon		Remainder
		100.00%

d. A micro-saponification number determination and tests with various solvents on the preservative coating found on the instrument has identified the preservative as high molecular weight petroleum jelly.

(1) Spectrochemical examination of the preservative revealed traces of aluminum, calcium, copper, iron, potassium, magnesium, sodium, and silicon, but no metallic constituent of sufficient strength to indicate the presence of a metallic soap.

e. Examination of the impregnated paper in which the instrument was wrapped disclosed that it is an ordinary parchmentized kraft paper.

f. Examination of the instrument case was conducted as follows:

(1) The wood was visually identified as birch.

(2) The adhesive used in bonding the layers forming the plywood has the general characteristics of blood albumen glue. These characteristics were determined as follows:

(a) The glue line has a dark brown glassy appearance.

(b) The adhesive has no characteristic odor.

(c) The adhesive is resistant to cold water, but swells and softens in boiling water.

(d) The adhesive is slightly acid exhibiting a pH of 5.

(e) The adhesive reacts positive to Millon's reagent and to the Biuret reaction for proteins.

(f) Staining of the adhesive with eosin produced a dark red color.

(3) The adhesive used in putting the case together shows reactions as set forth below indicating casein as a major constituent.

(a) Adhesive is very hard and opaque.

(b) The adhesive softens and swells appreciably in water but does not dissolve.

(c) The adhesive is strongly alkaline exhibiting a pH of 9.

(d) The particles after swelling are white; they react positive to protein reagents; and upon ignition they have a characteristic "burned-feather" odor.

g. The coating (varnish) on the instrument case has the general characteristics of a "spirit varnish" and resembles gum sandarac or gum mastic. These characteristics were determined as follows:

(1) The coating is readily abraded by the thumb nail, leaving a white mark.

(2) The coating is readily soluble in ethyl alcohol, solution taking place directly without intermediate swelling.

(3) Upon evaporation, the alcohol solution yields a reddish-brown, friable material with a mildly aromatic odor.

(4) The Storch-Morawski test for resin is negative.

(5) The acid number of the material is 70 and its saponification number is 110.

CONFIDENTIAL

(6) The coating is readily soluble in alcohol, ketones, and esters, but insoluble or only slightly soluble in hydrocarbons.

4. Conclusions drawn from the reported tests and analyses are as follows:

a. The caliper compares favorably with the best American examples of similar instruments.

b. The caliper meets the specifications of GOST 166-41 in all significant particulars.

c. The steel from which the caliper was made is conventional, with residual metals present in kind and quantity not unusual in USA plain carbon acid steels.

d. The preservative coating on the instrument is adequate but inferior to those used for comparable purposes in USA practice.

e. The paper wrapping around the instrument is adequate and conventional.

f. The instrument case is adequate but inferior to similar USA products, although the rabbet joint for the top and dove-tail joints at the corners would probably be considered expensive construction for the intended purpose in USA practice.

(1) The adhesives used in bonding the plywood and assembling the case probably would not stand up in damp or tropic climates.

(2) The "spirit varnish" is little better than shellac.

- end -

CONFIDENTIAL

CONFIDENTIAL